

Open reading frame 1a, Alignment of aminoacid sequence of PRRS virus strain ATCC VR-2332

1 MSGILDRCTC TPNARVFMÆ GQVYCTRCLS ARSLLPLNLQ VSELGVLGLF YRPEEPLRWT
61 LPRAFFTVEC SPAGACWLSA IFPIARMTSG NLNFQORMVR VAAELYRAGQ LTPAVLKALQ
121 VYERGCRWYP IVGPVPGVAV FANSLHVSDK PFPGATHVLT NLPLQRPKP EDFCFECAM
181 ATVYDIGHDA VMYVAERKVS WAPRGDEVK FEAVPGELKL IANRLRTSFP PHHTVDMSE
241 AFTAPGCGVS MRVERQHGCL PADTVPEGNC WWSLFDLLPL EVQNKIRHA NQFGYQTKHG
301 VSGKYLQRRLL QVNGLRVTD LNGPIVVQYF SVKESWIRHL KLAGEPSYSG FEDLLRIRVE
361 PNTSPLADKE EKIFRFGSHK WYGAGKRARK ARSCATATVA GRALSVRETR QAKEHEVAGA
421 NKAHLKHYS PPAEGNCGWH CISAIANRMV NSKFETLPE RVRPPDDWAT DEDLVNAIQI
481 LRLPAALDRN GACTSAKYVL KLEGEHWTVT VTPGMSPSLL PLECVQGCCG HKGGLGSPDA
541 VEVSGFDPAC LDRLAEVMHL PSSAIPAALA EMSGSDSRSA SPVTTVWTVS QFFARHSGGN
601 HPDQVRLGKI ISLCQVIEDC CCSQNKTNRV TPEEVAAKID LYLRGATNLE ECLARLEKAR

Fig. 1

661 PPRVIDTSFD WDVVLPQVEA ATQTIKLPQV NQCRALVPVV TQKSLDNNV PLTAFSLANY
721 YYRAQGEVR HRERLTAVLS KLEKVVREY GLMTEPGPR PTLPRGLDEL KDQMEEDLLK
781 LANAQTSDM MAWAVEQVDL KTWVKYPRW TTPPPPPKVQ PRKTKPVKSL PERKVPVAPR
841 RKGSDCGSP VSLGGDVPNS WEDLAVSSPF DLTPPEPAT PSSELVIVSS PQCIFRPATP
901 LSEPAPIPAP RGTVSRPVTP LSEPIVPAP RRKFQQVKRL SSAAAIPPYQ DEPLDLSASS
961 QTEYEASPPA PPQGGVLGV EGHEAEETLS EISDMSGNIK PASVSSSSSL SSVRITRPKY
1021 SAQAIIIDSGG PCSGHLQEVK ETCLSVMREA CDATKLDDPA TQEWLSRMWD RVDMLTWRNT
1081 SVYQAICTLD GRKFLPKMI LETPPYPCE FVMHPHPAP SVGAESDLTI GSVATEDVPR
1141 ILEKIENVGE MANQPLAFS EDKPVDDQLV NDPRISRRP DESTSAPSAG TGGAGSFTDL
1201 PPSDGADADG GGPFRTVKRK AERLFDQLSR QVFDLVSHLP VFFSRLFYPG GGYSPPGDWGF
1261 AAFTHLCLFL CYSYPAFGIA PLLGVFSGSS RVRMGVFGC WLAFVGLFK PVSDPVGAAC

1321 EFDSPECRNI LHSFELLKPW DPVRSLVVGP VGLGLAILGR LLGGARCIWH FLRLGIVAD
1381 CILAGAYVLS QGRCKKCWGS CIRTAPNEVA FNVFFTRAT RSSLIDLCDR FCAPKGMDFI
1441 FLATGWRGCW AGRSPIEQPS EKPIAFAQLD EKKITARTVV AQPYDPNQAV KCLRVLQSGG
1501 RWWSLG-PKS GQFRCIPS PFFPTGVKVD PDCRVVDDPD TFTAALRSY STTNVLVGVG
1561 DFAQLNGLKI RQISKPSGGG PHLMAALHVA CSMALHMLAG IYVTAVGSCG TGTNDPWCAN
1621 PFAVPGYGP G SLCTSRLCIS QHGLTLPLTA LVAGFGIQEI ALVVLIFVSI GGMAHRLSCK
1681 ADMLCVLLAI ASYVWVPLTW LLCVFPCWLR CFSLHPLTIL WLVEFLISVN MPGILAMVL
1741 LVSLWLLGRY TNVAGLVTPY DIHHYTSQPR GVAALATAPD GTYLAAVRRA ALTGRTMLFT
1801 PSQLGSLLEG AFRTRKPSLN TVNVIGSSMG SGGVFTIDGK VKCVTAHVHVL TGNSARVSGV
1861 GFNQMLDFDV KGDFAIADCP NWQGAAPKTQ FCTDGTGTRA YWLTSSGVEP GVIGKGFAFC
1921 FTACGDSGSP VITEAGELVG VHTGSNKQGG GIVTRPSQGF CNVAPIKLSE LSEFFAGPKV
1981 PLGDVKVGSH IIKDISEVPS DLCALLAAKP ELEGGLSTVQ LLCVFFLLWR MMGHAWTPLV

Fig. 1b

2041 AVSFFILNEV LPAVLVRSVF SFGMEVLSWL TPWSAQVIMI RLLTAALNRN RWSLAFFSLG
2101 AVTGEVADLA ATQGHPLQAV MNLSTYAFLP RMMVVTSPVP VITCGVVHLL AILYLEFKYR
2161 GPHHILVGDG VFSAAFFLRY FAEGKLREGV SOSCGMNHES LTGALAMRLN DEDLDFLMKW
2221 TDFKCFVSAS NMRNAAGQFI EAAYAKALRV ELAQLVQVDK VRGTLAKLEA FADTVAPQLS
2281 PGDIVVALGH TPVGSIFDLK VGSTKHTLQA IETRVLAGSK MTVARVVDPT PTPPPAPVPI
2341 PLPPKVLENG PNAWGDEDR L NKKKRRRMEA LGIYVMGGKK YQKFWDKNSG DVFYEEVHNN
2401 TDEWECLRVG DPADFDPKKG TLCGHVTIEN KAYHVYTS PS GKKFLVPVNP ENGRVQWEAA
2461 KLSVEQALGM MNVDGELTAK ELEKLKRIID KLQGLTKEQC LNC*

Fig. 1c

Open reading frame 1b, Alignment of aminoacid sequence of PRRS virus strain ATCC VR-2332

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1  LAASDLTRCG RGGLVVTEA VKIVKFHRT FTLGPVNLKV ASEVELKDAV EHNQHPVARP

61  IDGGVLLRS AVPSLIDVLI SGADASPKLL AHGPGNTGI DGTLDWESE ATKEEVALSA

121 QIIQACDIRR GDAPEIGLPY KLYPVRGNPE RVKGVLQNR FGDIPYKTPS DTGSPVHAAA

181 CLTPNATPVT DGRSVLATM PPGFELYVPT IPASVLDYLD SRPDCPKQLT EHGCEDAALK

241 DLSKYDLSTQ GFVLPGLRL VRKYLFAHVG KCPPVHRPST YPAKNMAGI NGNRFP TKDI

301 QSVPEIDVLC AQAVRENWQT VTPCTLKKQY CGKKKTRTIL GTNNFIALAH RAVLSGVTQG

361 FMKKAFNSPI ALGKNKFKEL QTPVLGRCL EADLASC DRST PAIVRWFAAN LLYELACAE E

421 HLP SYVLNCC HDLLVTQSGA VTKRGG LSSG DPITSVSNTI YSLVIYAQHM VLSYFKSGHP

481 HG LLLFLQDQL KFEDMLKVQP LIVYSDDLVL YAESPTMPNY HWWVEHLNLM LGFQTDPKKT

541 AITDSPSFLG CRIINGRQLV PNRDRILAAL AYHMKASNV EYYASAAAIL MDSCACLEYD

601 PEWFEEELVVG IAQCARKDGY SFPGTPFFMS MWEKLSN YE GKKS RVC GYC GAPAPYATAC

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Fig. 2

661 GLDVCYHHTH FHQHCPTIWIW CGHPAGSGSC SECKSPVGKG TSPIDEVLEQ VPKPPRTVI
721 MHVEQGLTPL DPGRYQTRRG LVSRRGIRG NEVGLPDGDY ASTALLPTCK EINMVAVASN
781 VLRSRFLIGP PGAGKTYWLL QQVQDGDVIY TPTHQTMIDM IRALGTCRFN VPAGTTLQFP
841 VPSRTGPWVR ILAGGWCPCGK NSFIDEAAYC NHLDVLRLLS KTTLTCLGDF KQLHPVGFDS
901 HCVYFDIMPQ TQKTIWRFQ QNICDAIQPD YRDKLMSMVN TTRVTYVEKP VRYGQVLTPIY
961 HRDREDDAIT IDSSQGATFD VVTLHLPTKD SLNRQALVA ITRARHAIFV YDPRQLQGL
1021 FDLPAKGTPV NIAVHCDGQL IVLDRNNKEC TVAQALNGD KFRATDKRVV DSLRAICADL
1081 EGSSSPLPKV AHNLGIFYFSP DLTQFAKLPV ELAPHWPVVS TQNNKWPDR LVASLRPIHK
1141 YSRACIGAGY MVGPSVFLGT PGVVSYYLTK FVKGGAQVLP ETVFSTGRIE VDCREYLDNR
1201 EREVAASLPH GFIGDVKGTT VGGCHHVTSR YLPRVLPKES VAVGVSSPG KAAKALCTLT
1261 DVYLPDLEAY LHPETQSKCW KMMLDFKEVR LMVWKDKTAY FQLEGRYFTW YQLASYASYI

Fig. 2a

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1321 RVPVNSTVYL DPCMGFALCN RRVVGSTHWG ADLAVTPYDY GAKIILSSAY HGEMPPGYKI

1381 LACAEFSLDD PVKYKHTWGF ESDTAYLYEF TGNGEDWEDY NDAFRARQEG KIYKATATSL

1441 KFYFFPGPVI EPTLGLN*

Fig. 2b

Open reading frame 2, Alignment of aminoacid sequence of PRRS virus strain ATCC VR-2332

1 MKWGPCKAFL TKLANFLWML SRSSWCPLLI SLYFWPFCLA SPSFVGWWSF ASDWEAPRYS
61 VRALPFTLSN YRRSYEAFLS QCQVDIPTWG TKHPLGLMLWH HKVSTLIDEM VSRRMYRIME
121 KAGQAANKQV VSEATLSRIS SLDVVAHFQH LAAIEAETCK YLASRLPMLH NLRMTGSNVT
181 IVYNSTLNQV FAIFPTPGSR PKLHDFQOWL IAVHSSIFSS VAASCTLFVV LWLRVPILRT
241 VFGFRWLGA I FLSNSQ*

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Fig. 3

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|---------|--------------------|--------------------|--------------------|---------------------------|--------------------|--------------------|
| VR 2332 | 10 ATGTCTGGGA | 20 TACTTGATCG | 30 GTGCACGTGT | 40 ACCCCCAATG | 50 CCAGGGTGTT | 60 TATGGCGGAG |
| VR 2332 | 70 GGCCAAGTCT | 80 ACTGCACACG | 90 ATGCCTCAGT | 100 GCACGGTCTC | 110 TCCTTCCCCT | 120 GAACCTCCAA |
| VR 2332 | 130 GTTTCTGAGC | 140 TCGGGGTGCT | 150 AGGCCTATTC | 160 TACAGGCCCG | 170 AAGAGCCACT | 180 CCGGTGGACG |
| VR 2332 | 190 TTGCCACGTG | 200 CATTCCCCAC | 210 TGTTGAGTGC | 220 TCCCCCGCCG | 230 GGGCCTGCTG | 240 GCTTTCTGCA |
| VR 2332 | 250 ATCTTTCCAA | 260 TCGCACGAAT | 270 GACCAGTGGA | 280 AACCTGAACT | 290 TCCAACAAAG | 300 AATGGTACGG |
| VR 2332 | 310 GTCGCAGCTG | 320 AGCTTTACAG | 330 AGCCGGCCAG | 340 CTCACCCCTG | 350 CAGTCTTGAA | 360 GGCTCTACAA |
| VR 2332 | 370 GTTTATGAAC | 380 GGGGTTGCCG | 390 CTGGTACCCC | 400 ATTGTTGGAC | 410 CTGTCCCTGG | 420 AGTGGCCGTT |
| VR 2332 | 430 TTCGCCAATT | 440 CCCTACATGT | 450 GAGTGATAAA | 460 CCTTTCCCAG | 470 GAGCAACTCA | 480 CGTGTGACC |
| VR 2332 | 490 AACCTGCCGC | 500 TCCCGCAGAG | 510 ACCCAAGCCT | 520 GAAGACTTTT | 530 GCCCCCTTGA | 540 GTGTGCTATG |
| VR 2332 | 550 GCTACTGTCT | 560 ATGACATTGG | 570 TCATGACGCC | 580 GTCATGTATG | 590 TGGCCGAAAG | 600 GAAAGTCTCC |
| VR 2332 | 610 TGGGCCCTC | 620 GTGGCGGGGA | 630 TGAAGTGAAG | 640 TTTGAAGCTG | 650 TCCCCGGGGA | 660 GTTGAAGTTG |
| VR 2332 | 670 ATTGCGAACC | 680 GGCTCCGCAC | 690 CTCCTTCCCG | 700 CCCCACCACA | 710 CAGTGGACAT | 720 GTCTAAGTTC |
| VR 2332 | 730 GCCTTCACAG | 740 CCCCTGGGTG | 750 TGGTGTCTT | 760 ATGCGGGTCG | 770 AACGCCAACA | 780 CGGCTGCCTT |
| VR 2332 | 790 CCCCTGACA | 800 CTGTCCCTGA | 810 AGGCAACTGC | 820 TGGTGGAGCT | 830 TGTTTGACTT | 840 GCTTCCACTG |
| VR 2332 | 850 GAAGTTCAGA | 860 ACAAAGAAAT | 870 TCGCCATGCT | 880 AACCAATTG | 890 GCTACCAGAC | 900 CAAGCATGGT |
| VR 2332 | 910 GTCTCTGGCA | 920 AGTACCTACA | 930 GCGGAGGCTG | 940 CAAGTTAATG | 950 GTCTCCGAGC | 960 AGTAACTGAC |
| VR 2332 | 970 CTAAACGGAC | 980 CTATCGTCGT | 990 ACAGTACTTC | 1000 <u>TCCGTAAAGG</u> | 1010 AGAGTTGGAT | 1020 CCGCCATTG |
| VR 2332 | 1030 AAACTGGCGG | 1040 GAGAACCCAG | 1050 CTACTCTGGG | 1060 TTTGAGGACC | 1070 TCCTCAGAAT | 1080 AAGGGTTGAG |
| VR 2332 | 1090 CCTAACACGT | 1100 CGCCATTGGC | 1110 TGACAAGGAA | 1120 GAAAAAATTT | 1130 TCCGGTTTGG | 1140 CAGTCACAAG |
| VR 2332 | 1150 TGGTACGGCG | 1160 CTGGAAAGAG | 1170 AGCAAGAAAA | 1180 GCACGCTCTT | 1190 GTGCGACTGC | 1200 TACAGTCGCT |
| VR 2332 | 1210 GGCCGCGCTT | 1220 TGTCCGTTCG | 1230 TGAAACCCGG | 1240 CAGGCCAAGG | 1250 AGCACGAGGT | 1260 TGCCGGCGCC |

Fig. 4

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|---------|---------------------|---------------------|--------------------|--------------------|--------------------|---------------------|
| VR 2332 | 1270 AACAAAGGCTG | 1280 AGCACCTCAA | 1290 ACACTACTCC | 1300 CCGCCTGCCG | 1310 AAGGGAATTG | 1320 TGGTTGGCAC |
| VR 2332 | 1330 TGCATTTCCG | 1340 CCATCGCCAA | 1350 CCGGATGGTG | 1360 AATTCCAAAT | 1370 TTGAAACCAC | 1380 CCTTCCCGAA |
| VR 2332 | 1390 AGAGTGAGAC | 1400 CTCCAGATGA | 1410 CTGGGCTACT | 1420 GACGAGGATC | 1430 TTGTGAATGC | 1440 CATCCAAATC |
| VR 2332 | 1450 CTCAGACTCC | 1460 CTGCGGCCTT | 1470 AGACAGGAAC | 1480 GGTGCTTGTA | 1490 CTAGCGCCAA | 1500 GTACGTACTT |
| VR 2332 | 1510 AAGCTGGAAG | 1520 GTGAGCATTG | 1530 GACTGTCACT | 1540 GTGACCCCTG | 1550 GGATGTCCCC | 1560 TTCTTTGCTC |
| VR 2332 | 1570 CCTCTTGAAT | 1580 GTGTTTCAGGG | 1590 CTGTTGTGGG | 1600 CACAAGGGCG | 1610 GTCTTGGTTC | 1620 CCCAGATGCA |
| VR 2332 | 1630 GTCGAGGTCT | 1640 CCGGATTTGA | 1650 CCCTGCCTGC | 1660 CTTGACCGGC | 1670 TGGCTGAGGT | 1680 GATGCACCTG |
| VR 2332 | 1690 CCTAGCAGTG | 1700 CTATCCCAGC | 1710 CGCTCTGGCC | 1720 GAAATGTCTG | 1730 GCGATTCCGA | 1740 TCGTTCCGGCT |
| VR 2332 | 1750 TCTCCGGTCA | 1760 CCACCGTGTG | 1770 GACTGTTTCG | 1780 CAGTTCCTTG | 1790 CCCGTCACAG | 1800 CGGAGGGAAT |
| VR 2332 | 1810 CACCTGACC | 1820 AAGTGCCTT | 1830 AGGGAAAATT | 1840 ATCAGCCTTT | 1850 GTCAGGTGAT | 1860 TGAGGACTGC |
| VR 2332 | 1870 TGCTGTTCCC | 1880 AGAACAAAAC | 1890 CAACCGGGTC | 1900 ACCCCGGAGG | 1910 AGGTCGCAGC | 1920 AAAGATTGAC |
| VR 2332 | 1930 CTGTACCTCC | 1940 GTGGTGCAAC | 1950 AAATCTTGAA | 1960 GAATGCTTGG | 1970 CCAGGCTTGA | 1980 GAAAGCGCGC |
| VR 2332 | 1990 CCGCCACGCG | 2000 TAATCGACAC | 2010 CTCCTTTGAT | 2020 TGGGATGTTG | 2030 TGCTCCCTGG | 2040 GGTTGAGGCG |
| VR 2332 | 2050 GCAACCCAGA | 2060 CGATCAAGCT | 2070 GCCCCAGGTC | 2080 AACCAGTGTC | 2090 GTGCTCTGGT | 2100 CCCTGTTGTG |
| VR 2332 | 2110 ACTCAAAAGT | 2120 CCTTGGACAA | 2130 CAACTCGGTC | 2140 CCCCTGACCG | 2150 CCTTTTCACT | 2160 GGCTAACTAC |
| VR 2332 | 2170 TACTACCGTG | 2180 CGCAAGGTGA | 2190 CGAAGTTCGT | 2200 CACCGTGAAA | 2210 GACTAACCGC | 2220 CGTGCTCTCC |
| VR 2332 | 2230 AAGTTGGAAA | 2240 AGGTTGTTCG | 2250 AGAAGAATAT | 2260 GGGCTCATGC | 2270 CAACCGAGCC | 2280 TGGTCCACGG |
| VR 2332 | 2290 CCCACACTGC | 2300 CACGCGGGCT | 2310 CGACGAACTC | 2320 AAAGACCAGA | 2330 TGGAGGAGGA | 2340 CTTGCTGAAA |
| VR 2332 | 2350 CTGGCTAACG | 2360 CCCAGACGAC | 2370 TTCGGACATG | 2380 ATGGCCTGGG | 2390 CAGTCGAGCA | 2400 GGTTGACCTA |
| VR 2332 | 2410 AAAACCTGGG | 2420 TCAAGAACTA | 2430 CCCGCGGTGG | 2440 ACACCACCAC | 2450 CCCCTCCGCC | 2460 AAAAGTTTCA |
| VR 2332 | 2470 CCTCGAAAAA | 2480 CGAAGCCTGT | 2490 CAAGAGCTTG | 2500 CCGGAGAGAA | 2510 AGCCTGTCCC | 2520 CGCCCCGCGC |

Fig. 4a

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|---------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
| VR 2332 | 2530 AGGAAGGTTG | 2540 GGTCCGATTG | 2550 TGGCAGCCCG | 2560 GTTTCATTAG | 2570 GCGGCGATGT | 2580 CCCTAACAGT |
| VR 2332 | 2590 TGGGAAGATT | 2600 TGGCTGTTAG | 2610 TAGCCCCTTT | 2620 GATCTCCCGA | 2630 CCCCACCTGA | 2640 GCCGGCAACA |
| VR 2332 | 2650 CCTTCAAGTG | 2660 AGCTGGTGAT | 2670 TGTGTCCTCA | 2680 CCGCAATGCA | 2690 TCTTCAGGCC | 2700 GGCGACACCC |
| VR 2332 | 2710 TTGAGTGAGC | 2720 CGGCTCCAAT | 2730 TCCCGCACCT | 2740 CGCGGAACTG | 2750 TGTCTCGACC | 2760 GGTGACACCC |
| VR 2332 | 2770 TTGAGTGAGC | 2780 CGATCCCTGT | 2790 GCCCCGACCG | 2800 CGGCGTAAGT | 2810 TTCAGCAGGT | 2820 GAAAAGATTG |
| VR 2332 | 2830 AGTTCGGCGG | 2840 CGGCAATCCC | 2850 ACCGTACCAG | 2860 GACGAGCCCC | 2870 TGGATTTGTC | 2880 TGCTTCCTCA |
| VR 2332 | 2890 CAGACTGAAT | 2900 ATGAGGCCTC | 2910 TCCCCAGCA | 2920 CCGCCGCAGA | 2930 GCGGGGGCGT | 2940 TCTGGGAGTA |
| VR 2332 | 2950 GAGGGGCATG | 2960 AAGCTGAGGA | 2970 AACCCTGAGT | 2980 GAAATCTCGG | 2990 ACATGTCGGG | 3000 TAACATTAAA |
| VR 2332 | 3010 CCTGCGTCCG | 3020 TGTCATCAAG | 3030 CAGCTCCTTG | 3040 TCCAGCGTGA | 3050 GAATCACACG | 3060 CCCAAATAC |
| VR 2332 | 3070 TCAGCTCAAG | 3080 CCATCATCGA | 3090 CTCGGGCGGG | 3100 CCCTGCAGTG | 3110 GGCATCTCCA | 3120 AGAGGTAAAG |
| VR 2332 | 3130 GAAACATGCC | 3140 TTAGTGTCAT | 3150 GCGCGAGGCA | 3160 TGTGATGCGA | 3170 CTAAGCTTGA | 3180 TGACCCTGCT |
| VR 2332 | 3190 ACGCAGGAAT | 3200 GGCTTTCTCG | 3210 CATGTGGGAT | 3220 CGGGTGGACA | 3230 TGCTGACTTG | 3240 GCGCAACACG |
| VR 2332 | 3250 TCTGTTTACC | 3260 AGGCGATTTG | 3270 CACCTTAGAT | 3280 GGCAGGTTAA | 3290 AGTTCCTCCC | 3300 AAAAATGATA |
| VR 2332 | 3310 CTCGAGACAC | 3320 CGCCGCCCTA | 3330 TCCGTGTGAG | 3340 TTTGTGATGA | 3350 TGCCTCACAC | 3360 GCCTGCACCT |
| VR 2332 | 3370 TCCGTAGGTG | 3380 CGGAGAGCGA | 3390 CCTTACCATT | 3400 GGCTCAGTTG | 3410 CTACTGAAGA | 3420 TGTTCCACGC |
| VR 2332 | 3430 ATCCTCGAGA | 3440 AAATAGAAAA | 3450 TGTCGGCGAG | 3460 ATGGCCAACC | 3470 AGGGACCCTT | 3480 GGCCTTCTCC |
| VR 2332 | 3490 GAGGATAAAC | 3500 CGGTAGATGA | 3510 CCAACCTGTC | 3520 AACGACCCCC | 3530 GGATATCGTC | 3540 GCGGAGGCCT |
| VR 2332 | 3550 GACGAGAGCA | 3560 CATCAGCTCC | 3570 GTCCGCAGGC | 3580 ACAGGTGGCG | 3590 CCGGCTCTTT | 3600 TACCGATTTG |
| VR 2332 | 3610 CCGCCTTCAG | 3620 ATGGCGCGGA | 3630 TGCGGACGGG | 3640 GGGGGGCCGT | 3650 TTCGGACGGT | 3660 AAAAAGAAAA |
| VR 2332 | 3670 GCTGAAAGGC | 3680 TCTTTGACCA | 3690 ACTGAGCCGT | 3700 CAGGTTTTTG | 3710 ACCTCGTCTC | 3720 CCATCTCCCT |
| VR 2332 | 3730 GTTTTCTTCT | 3740 CACGCCTTTT | 3750 CTACCCTGGC | 3760 GGTGGTTATT | 3770 CTCCGGGTGA | 3780 TTGGGGTTTT |

Fig. 4b

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|---------|------------|------------|------------|------------|------------|------------|
| VR 2332 | 3790 | 3800 | 3810 | 3820 | 3830 | 3840 |
| | GCAGCTTTTA | CTCTATTGTG | CCTCTTTTTA | TGTTACAGTT | ACCCAGCCTT | TGGTATTGCT |
| VR 2332 | 3850 | 3860 | 3870 | 3880 | 3890 | 3900 |
| | CCCCCTCTTG | GTGTGTTTTT | TGGGTCTTCT | CGGCGCGTTC | GAATGGGGGT | TTTTGGCTGC |
| VR 2332 | 3910 | 3920 | 3930 | 3940 | 3950 | 3960 |
| | TGGTTGGCTT | TTGCTGTTGG | TCTGTTCAAG | CCTGTGTCCG | ACCCAGTCGG | CGCTGCTTGT |
| VR 2332 | 3970 | 3980 | 3990 | 4000 | 4010 | 4020 |
| | GAGTTTGACT | CGCCAGAGTG | TAGAAACATC | CTTCATTCTT | TTGAGCTTCT | CAAACCTTGG |
| VR 2332 | 4030 | 4040 | 4050 | 4060 | 4070 | 4080 |
| | GACCCTGTTC | GCAGCCTTGT | TGTGGGCCCC | GTCGGTCTCG | GTCTTGCCAT | TCTTGGCAGG |
| VR 2332 | 4090 | 4100 | 4110 | 4120 | 4130 | 4140 |
| | TTACTGGGCG | GGGCACGCTG | CATCTGGCAC | TTTTTGCTTA | GGCTTGGCAT | TGTTGCAGAC |
| VR 2332 | 4150 | 4160 | 4170 | 4180 | 4190 | 4200 |
| | TGTATCTTGG | CTGGAGCTTA | CGTGCTTTCT | CAAGGTAGGT | GTAAAAAGTG | CTGGGGATCT |
| VR 2332 | 4210 | 4220 | 4230 | 4240 | 4250 | 4260 |
| | TGTATAAGAA | CTGCTCCTAA | TGAGGTCGCT | TTTAACGTGT | TTCCTTTCAC | ACGTGCGACC |
| VR 2332 | 4270 | 4280 | 4290 | 4300 | 4310 | 4320 |
| | AGGTCGTCAC | TTATCGACCT | GTGCGATCGG | TTTTGTGCGC | CAAAAGGAAT | GGACCCCAT |
| VR 2332 | 4330 | 4340 | 4350 | 4360 | 4370 | 4380 |
| | TTTCTCGCCA | CTGGGTGGCG | CGGGTGCTGG | GCCGGCCGAA | GCCCCATTGA | GCAACCCTCT |
| VR 2332 | 4390 | 4400 | 4410 | 4420 | 4430 | 4440 |
| | GAAAAACCCA | TCGCGTTTGC | CCAATTGGAT | GAAAAGAAGA | TTACGGCTAG | GACTGTGGTC |
| VR 2332 | 4450 | 4460 | 4470 | 4480 | 4490 | 4500 |
| | GCCCAGCCTT | ATGACCCCAA | CCAAGCCGTA | AAGTGCTTGC | GGGTATTGCA | GTCGGGTGGG |
| VR 2332 | 4510 | 4520 | 4530 | 4540 | 4550 | 4560 |
| | CGATGGTGGC | TAAGCGGTCC | CAAAAGTGGT | CAAGGTTTCC | GCTGTTCCAT | TCCGAGCCCC |
| VR 2332 | 4570 | 4580 | 4590 | 4600 | 4610 | 4620 |
| | TTCTTTCCCA | CTGGAGTGAA | AGTTGACCCT | GATTGCAGGG | TCGTGGTTGA | CCCTGACACT |
| VR 2332 | 4630 | 4640 | 4650 | 4660 | 4670 | 4680 |
| | TTCACTGCAG | CTCTCCGGTC | TGGCTACTCC | ACCACAAACC | TCGTCCTTGG | TGTAGGGGAC |
| VR 2332 | 4690 | 4700 | 4710 | 4720 | 4760 | 4740 |
| | TTTGCCCAGC | TGAATGGATT | AAAAATCAGG | CAAATTTCCA | AGCCTTCAGG | GGGAGGCCCA |
| VR 2332 | 4750 | 4760 | 4770 | 4780 | 4790 | 4800 |
| | CATCTCATGG | CTGCCCTGCA | TGTTGCCTGC | TCGATGGCTC | TGCACATGCT | TGCTGGGATT |
| VR 2332 | 4810 | 4820 | 4830 | 4840 | 4850 | 4860 |
| | TATGTGACTG | CGGTGGGTTC | TTGCGGCACC | GGCACCAACG | ACCCGTGGTG | CGCTAACCCG |
| VR 2332 | 4870 | 4880 | 4890 | 4900 | 4910 | 4920 |
| | TTTGCCGTCC | CTGGCTACGG | ACCTGGCTCT | CTCTGCACGT | CCAGGTTGTG | CATTTCCCAA |
| VR 2332 | 4930 | 4940 | 4950 | 4960 | 4970 | 4980 |
| | CACGGCCTTA | CCCTGCCCTT | GACAGCACTT | GTGGCGGGAT | TCGGTATTCA | AGAAATTGCC |
| VR 2332 | 4990 | 5000 | 5010 | 5020 | 5030 | 5040 |
| | TTGGTCGTTT | TGATTTTTGT | TTCCATCGGA | GGCATGGCTC | ATAGGTTGAG | CTGTAAGGCT |

Fig. 4c

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|---------|--------------------|---------------------|--------------------|---------------------|---------------------|--------------------|
| VR 2332 | 5050 GACATGCTGT | 5060 GTGTTTTGCT | 5070 TGCAATTGCC | 5080 AGCTATGTTT | 5090 GGGTACCTCT | 5100 TACCTGGTTG |
| VR 2332 | 5110 CTTTGTGTGT | 5120 TTCCTTGCTG | 5130 GTTGCGCTGT | 5140 TTTCTTTTGC | 5150 ACCCCCTCAC | 5160 CATCCTATGG |
| VR 2332 | 5170 TTGGTGTTTT | 5180 TCCTTGATTC | 5190 TGTGAATATG | 5200 CCTTCAGGAA | 5210 TCCTGGCCAT | 5220 GGTGTTGTTG |
| VR 2332 | 5230 GTTTCTCTTT | 5240 GGCTTCTTGG | 5250 TCGTTATACT | 5260 AATGTTGCTG | 5270 GCCTTGTCAC | 5280 CCCCTACGAC |
| VR 2332 | 5290 ATTCATCATT | 5300 ACACCAGTGG | 5310 CCCCCGCGGT | 5320 GTTGCCGCCT | 5330 TGGCTACCGC | 5340 ACCAGATGGG |
| VR 2332 | 5350 ACCTACTTGG | 5360 CCGCTGTCCG | 5370 CCGCGCTGCG | 5380 TTGACTGGCC | 5390 GCACCATGCT | 5400 GTTTACCCCG |
| VR 2332 | 5410 TCCCAGCTTG | 5420 GGTCTCTTCT | 5430 TGAGGGTGCT | 5440 TTCAGAACTC | 5450 GAAAGCCCTC | 5460 ACTGAACACC |
| VR 2332 | 5470 GTCAATGTGA | 5480 TCGGGTCCCTC | 5490 CATGGGCTCT | 5500 GGCGGGGTGT | 5510 TTACCATCGA | 5520 CGGGAAAGTC |
| VR 2332 | 5530 AAGTGCGTAA | 5540 CTGCCGCACA | 5550 TGTCTTACG | 5560 GGCAATTCAG | 5570 CTCGGGTTTC | 5580 CGGGGTCGGC |
| VR 2332 | 5590 TTCAATCAAA | 5600 TGCTTGACTT | 5610 TGACGTAAAG | 5620 GGAGATTTTCG | 5630 CTATAGCTGA | 5640 TTGCCCGAAT |
| VR 2332 | 5650 TGGCAAGGGG | 5660 CTGCCCCCAA | 5670 GACCCAATTC | 5680 TGCACGGATG | 5690 GATGGACTGG | 5700 CCGTGCCTAT |
| VR 2332 | 5710 TGGCTAACAT | 5720 CCTCTGGCGT | 5730 CGAACCCGGC | 5740 GTCATTGGAA | 5750 AAGGATTCGC | 5760 CTTCTGCTTC |
| VR 2332 | 5770 ACCGCATGTG | 5780 GCGATTCCGG | 5790 GTCCCCAGTG | 5800 ATCACCGAGG | 5810 CCGGTGAGCT | 5820 TGTCGGCGTT |
| VR 2332 | 5830 CACACGGGAT | 5840 CGAATAAACA | 5850 AGGGGGGGGC | 5860 ATTGTTACGC | 5870 GCCCCCTCAGG | 5880 CCAGTTTTGT |
| VR 2332 | 5890 AATGTGGCAC | 5900 CCATCAAGCT | 5910 AAGCGAATTA | 5920 AGTGAATTCT | 5930 TTGCTGGGCC | 5940 TAAGGTCCCC |
| VR 2332 | 5950 CTCGGTGATG | 5960 TGAAGGTCGG | 5970 CAGCCACATA | 5980 ATTAAAGACA | 5990 TAAGCGAGGT | 6000 GCCTTCAGAT |
| VR 2332 | 6010 CTTTGTGCCT | 6020 TGCTTGCTGC | 6030 CAAACCTGAA | 6040 CTGGAAGGAG | 6050 GCCTCTCCAC | 6060 CGTCCAACCT |
| VR 2332 | 6070 CTTTGTGTGT | 6080 TTTTTCTCCT | 6090 GTGGAGAATG | 6100 ATGGGACATG | 6110 CCTGGACGCC | 6120 CTTGGTTGCT |
| VR 2332 | 6130 GTGAGTTTCT | 6140 TTATTTTGAA | 6150 TGAGGTTCTC | 6160 CCAGCCGTCC | 6170 TGGTCCGGAG | 6180 TGTTTTCTCC |
| VR 2332 | 6190 TTTGGAATGT | 6200 TTGTGCTATC | 6210 CTGGCTCACG | 6220 CCATGGTCTG | 6230 CGCAAGTTCT | 6240 GATGATCAGG |
| VR 2332 | 6250 CTTCTGACAG | 6260 CAGCTCTTAA | 6270 CAGGAACAGA | 6280 TGGTCACTTG | 6290 CCTTTTTTCAG | 6300 CCTCGGTGCA |

Fig. 4d

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| | | | | | | |
|---------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
| VR 2332 | 6310 GTGACCGGTT | 6320 TTGTCGCAGA | 6330 TCTTGCGGGC | 6340 ACTCAGGGGC | 6350 ATCCGTTGCA | 6360 GGCAGTGATG |
| VR 2332 | 6370 AATTTGAGCA | 6380 CCTATGCATT | 6390 CCTGCCTCGG | 6400 ATGATGGTTG | 6410 TGACCTCACC | 6420 AGTCCCAGTG |
| VR 2332 | 6430 ATCACGTGTG | 6440 GTGTCGTGCA | 6450 CCTACTTGCC | 6460 ATCATTTTGT | 6470 ACTTGTTTAA | 6480 GTACCGTGGC |
| VR 2332 | 6490 CCGCACCATA | 6500 TCCTTGTTGG | 6510 CGATGGAGTG | 6520 TTCTCTGCGG | 6530 CTTCTCTCTT | 6540 GAGATACTTT |
| VR 2332 | 6550 GCCGAGGGAA | 6560 AGTTGAGGGA | 6570 AGGGGTGTG | 6580 CAATCCTGCG | 6590 GAATGAATCA | 6600 TGAGTCTCTG |
| VR 2332 | 6610 ACTGGTGCCC | 6620 TCGCTATGAG | 6630 ACTCAATGAC | 6640 GAGGACTTGG | 6650 ATTTCTTTAT | 6660 GAAATGGACT |
| VR 2332 | 6670 GATTTTAAGT | 6680 GCTTTGTTTC | 6690 TGCCTCCAAC | 6700 ATGAGGAATG | 6710 CAGCGGGTCA | 6720 ATTTATCGAG |
| VR 2332 | 6730 GCTGCCTATG | 6740 CTAAAGCACT | 6750 TAGAGTAGAA | 6760 CTGGCCCAGT | 6770 TGGTGCAGGT | 6780 TGATAAAGTT |
| VR 2332 | 6790 CGAGGTACTT | 6800 TGGCCAAACT | 6810 TGAAGCTTTT | 6820 GCTGATACCG | 6830 TGGCACCTCA | 6840 ACTCTCGCCC |
| VR 2332 | 6850 GGTGACATTG | 6860 TTGTCGCTCT | 6870 CGGCCACACG | 6880 CCTGTTGGCA | 6890 GTATCTTCGA | 6900 CCTAAAGGTT |
| VR 2332 | 6910 GGTAGCACCA | 6920 AGCATACCCT | 6930 CCAAGCCATT | 6940 GAGACCAGAG | 6950 TCCTTGCTGG | 6960 GTCCAAAATG |
| VR 2332 | 6970 ACCGTGGCGC | 6980 GCGTCGTCGA | 6990 CCCGACCCCC | 7000 ACGCCCCCAC | 7010 CCGCACCCGT | 7020 GCCCATCCCC |
| VR 2332 | 7030 CTCCCACCGA | 7040 AAGTTCCTGA | 7050 GAATGGCCCC | 7060 AACGCTTGCG | 7070 GGGATGAGGA | 7080 CCGTTTGAAT |
| VR 2332 | 7090 AAGAAGAAGA | 7100 GGCGCAGGAT | 7110 GGAAGCCCTC | 7120 GGCATCTATG | 7130 TTATGGGCGG | 7140 GAAAAAGTAC |
| VR 2332 | 7150 CAGAAATTTT | 7160 GGGACAAGAA | 7170 TTCCGGTGAT | 7180 GTGTTTTATG | 7190 AGGAGGTCCA | 7200 TAATAACACA |
| VR 2332 | 7210 GATGAGTGGG | 7220 AGTGTCTCAG | 7230 AGTTGGCGAC | 7240 CCTGCCGACT | 7250 TTGACCCTGA | 7260 GAAGGGAAGT |
| VR 2332 | 7270 CTGTGTGGAC | 7280 ATGTCACCAT | 7290 TGAAAACAAG | 7300 GCTTACCATG | 7310 TTTACACCTC | 7320 CCCATCTGGT |
| VR 2332 | 7330 AAGAAGTTCT | 7340 TGGTCCCCGT | 7350 CAACCCAGAG | 7360 AATGGAAGAG | 7370 TTCAATGGGA | 7380 AGCTGCAAAG |
| VR 2332 | 7390 CTTTCCGTGG | 7400 AGCAGGCCCT | 7410 AGGTATGATG | 7420 AATGTCGACG | 7430 GCGAACTGAC | 7440 TGCCAAAGAA |
| VR 2332 | 7450 CTGGAGAAAC | 7460 TGAAAAGAAT | 7470 AATTGACAAA | 7480 CTCCAGGGCC | 7490 TGACTAAGGA | 7500 GCAGTGTTTA |
| VR 2332 | 7509 AACTGCTAG | | | | | |

Fig. 4e

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| | | | | | | |
|---------|-------------|-------------|------------|------------|-------------|-------------|
| VR 2332 | 10 | 20 | 30 | 40 | 50 | 60 |
| | CTAGCCGCCA | GCGACTTGAC | CCGCTGTGGT | CGCGGCGGCT | TGGTTGTTAC | TGAAACAGCG |
| VR 2332 | 70 | 80 | 90 | 100 | 110 | 120 |
| | GTAAAAATAG | TCAAATTTCA | CAACCGGACC | TTCACCCTGG | GACCTGTGAA | TTTAAAAAGTG |
| VR 2332 | 130 | 140 | 150 | 160 | 170 | 180 |
| | GCCAGTGAGG | TTGAGCTAAA | AGACGCGGTT | GAGCACAACC | AACACCCGGT | TGCGAGACCG |
| VR 2332 | 190 | 200 | 210 | 220 | 230 | 240 |
| | ATCGATGGTG | GAGTTGTGCT | CCTGCGTTCC | GCGGTTCCCT | CGCTTATAGA | CGTCTTGATC |
| VR 2332 | 250 | 260 | 270 | 280 | 290 | 300 |
| | TCCGGTGCTG | ATGCATCTCC | CAAGTTACTT | GCCCATCACG | GGCCGGGAAA | CACTGGGATC |
| VR 2332 | 310 | 320 | 330 | 340 | 350 | 360 |
| | GATGGCACGC | TCTGGGATTT | TGAGTCCGAA | GCCACTAAAG | AGGAAGTCGC | ACTCAGTGCG |
| VR 2332 | 370 | 380 | 390 | 400 | 410 | 420 |
| | CAAATAATAC | AGGCTTGTGA | CATTAGGCGC | GGCGACGCTC | CTGAAATTGG | TCTCCCTTAC |
| VR 2332 | 430 | 440 | 450 | 460 | 470 | 480 |
| | AAGCTGTACC | CTGTTAGGGG | TAACCCTGAG | CGGGTGAAAG | GAGTTCCTGA | GAATACAAGG |
| VR 2332 | 490 | 500 | 510 | 520 | 530 | 540 |
| | TTTGGAGACA | TACCTTACAA | AACCCCAGT | GACACTGGAA | GCCCAGTGCA | CGCGGCTGCC |
| VR 2332 | 550 | 560 | 570 | 580 | 590 | 600 |
| | TGCCTTACGC | CCAACGCCAC | TCCGGTGACT | GATGGGCGCT | CCGTCTTGGC | CACGACCATG |
| VR 2332 | 610 | 620 | 630 | 640 | 650 | 660 |
| | CCCCCGGGT | TTGAGTTATA | TGTACCGACC | ATACCAGCGT | CTGTCCTTGA | TTACCTTGAC |
| VR 2332 | 670 | 680 | 690 | 700 | 710 | 720 |
| | TCTAGGCCTG | ACTGCCCTAA | ACAGCTGACA | GAGCACGGCT | GCGAAGATGC | CGCACTGAAA |
| VR 2332 | 730 | 740 | 750 | 760 | 770 | 780 |
| | GACCTCTCTA | AATATGACTT | GTCCACCCAA | GGCTTTGTTT | TACCTGGAGT | TCTTCGCTT |
| VR 2332 | 790 | 800 | 810 | 820 | 830 | 840 |
| | GTGCGGAAAT | ACCTGTTTGC | CCATGTAGGT | AAGTGCCAC | CCGTTTCATCG | GCCTTCTACT |
| VR 2332 | 850 | 860 | 870 | 880 | 890 | 900 |
| | TACCCTGCTA | AGAATTCTAT | GGCTGGAATA | AATGGGAACA | GGTTCCCAAC | CAAGGACATT |
| VR 2332 | 910 | 920 | 930 | 940 | 950 | 960 |
| | CAGAGCGTCC | CTGAAATCGA | CGTTCTGTGC | GCACAGGCTG | TGCGAGAAAA | CTGGCAAAC |
| VR 2332 | 970 | 980 | 990 | 1000 | 1010 | 1020 |
| | GTCACCCCTT | GTA CTCTTAA | GAAACAGTAT | TGCGGGAAGA | AGAAGACTAG | GACCATACTC |
| VR 2332 | 1030 | 1040 | 1050 | 1060 | 1070 | 1080 |
| | GGCACCAATA | ACTTCATCGC | ACTAGCCCAC | CGAGCAGTGT | TGAGTGGTGT | TACCCAGGGC |
| VR 2332 | 1090 | 1100 | 1110 | 1120 | 1130 | 1140 |
| | TTTCATGAAAA | AGGCGTTTAA | CTCGCCCATC | GCCCTCGGAA | AGAACAAGTT | TAAGGAGCTA |
| VR 2332 | 1150 | 1160 | 1170 | 1180 | 1190 | 1200 |
| | CAGACTCCGG | TCCTGGGCAG | GTGCCTTGAA | GCTGATCTCG | CATCCTGCGA | TCGATCCACG |
| VR 2332 | 1210 | 1220 | 1230 | 1240 | 1250 | 1260 |
| | CCTGCAATTG | TCCGCTGGTT | TGCCGCCAAC | CTTCTTTATG | AACTTGCCTG | TGCTGAAGAG |

Fig. 5

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| | | | | | | |
|---------|--------------------|---------------------|--------------------|--------------------|--------------------|--------------------|
| VR 2332 | 1270 CATCTACCGT | 1280 CGTACGTGCT | 1290 GAACTGCTGC | 1300 CACGACTTAC | 1310 TGGTCACGCA | 1320 GTCCGGCGCA |
| VR 2332 | 1330 GTGACTAAGA | 1340 GAGGTGGCCT | 1350 GTCGTCTGGC | 1360 GACCCGATCA | 1370 CCTCTGTGTC | 1380 TAACACCATT |
| VR 2332 | 1390 TATAGTTTGG | 1400 TGATCTATGC | 1410 ACAGCATATG | 1420 GTGCTTAGTT | 1430 ACTTCAAAAG | 1440 TGGTCACCCC |
| VR 2332 | 1450 CATGGCCTTC | 1460 TGTTCTTACA | 1470 AGACCAGCTA | 1480 AAGTTTGAGG | 1490 ACATGCTCAA | 1500 GGTTCAACCC |
| VR 2332 | 1510 CTGATCGTCT | 1520 ATTTCGGACGA | 1530 CCTCGTGCTG | 1540 TATGCCGAGT | 1550 CTCCCACCAT | 1560 GCCAAACTAT |
| VR 2332 | 1570 CACTGGTGGG | 1580 TTGAACATCT | 1590 GAATTTGATG | 1600 CTGGGGTTTC | 1610 AGACGGACCC | 1620 AAAGAAGACA |
| VR 2332 | 1630 GCAATAACAG | 1640 ACTCGCCATC | 1650 ATTTCTAGGC | 1660 TGTAGAATAA | 1670 TAAATGGGCG | 1680 CCAGCTAGTC |
| VR 2332 | 1690 CCCAACCGTG | 1700 ACAGGATCCT | 1710 CGCGGCCCTC | 1720 GCCTATCACA | 1730 TGAAGGCGAG | 1740 TAATGTTTCT |
| VR 2332 | 1750 GAATACTATG | 1760 CCTCAGCGGC | 1770 TGCAATACTC | 1780 ATGGACAGCT | 1790 GTGCTTGTTT | 1800 GGAGTATGAT |
| VR 2332 | 1810 CCTGAATGGT | 1820 TTGAAGAACT | 1830 TGTAAGTTGA | 1840 ATAGCGCAGT | 1850 GCGCCCGCAA | 1860 GGACGGCTAC |
| VR 2332 | 1870 AGCTTTCCCG | 1880 GCACGCCGTT | 1890 CTTCATGTCC | 1900 ATGTGGGAAA | 1910 AACTCAGGTC | 1920 CAATTATGAG |
| VR 2332 | 1930 GGGAAGAAGT | 1940 CGAGAGTGTG | 1950 CGGGTACTGC | 1960 GGGGCCCCGG | 1970 CCCCGTACGC | 1980 TACTGCCTGT |
| VR 2332 | 1990 GGCCTCGACG | 2000 TCTGCATTTA | 2010 CCACACCCAC | 2020 TTCCACCAGC | 2030 ATTGTCCAGT | 2040 CACAATCTGG |
| VR 2332 | 2050 TGTGGCCATC | 2060 CAGCGGGTTC | 2070 TGTTCTTGT | 2080 AGTGAGTGCA | 2090 AATCCCCTGT | 2100 AGGGAAAGGC |
| VR 2332 | 2110 ACAAGCCCTT | 2120 TAGACGAGGT | 2130 GCTGGAACAA | 2140 GTCCCGTATA | 2150 AGCCCCCAGC | 2160 GACCGTTATC |
| VR 2332 | 2170 ATGCATGTGG | 2180 AGCAGGGTCT | 2190 CACCCCCCTT | 2200 GATCCAGGTA | 2210 GATACCAAAC | 2220 TCGCCGCGGA |
| VR 2332 | 2230 TTAGTCTCTG | 2240 TCAGGCGTGG | 2250 AATTAGGGGA | 2260 AATGAAGTTG | 2270 GACTACCAGA | 2280 CGGTGATTAT |
| VR 2332 | 2290 GCTAGACCG | 2300 CCTTGCTCCC | 2310 TACCTGCAAA | 2320 GAGATCAACA | 2330 TGGTCGCTGT | 2340 CGCTTCCAAT |
| VR 2332 | 2350 GTATTGCGCA | 2360 GCAGGTTTCAT | 2370 CATCGGCCCA | 2380 CCCGGTGCTG | 2390 GGAAAACATA | 2400 CTGGCTCCTT |
| VR 2332 | 2410 CAACAGGTCC | 2420 AGGATGGTGA | 2430 TGTTATTTAC | 2440 ACACCAACTC | 2450 ACCAGACCAT | 2460 GCTTGACATG |
| VR 2332 | 2470 ATTAGGGCTT | 2480 TGGGGACGTG | 2490 CCGGTTCAAC | 2500 GTCCCGGCAG | 2510 GCACAACGCT | 2520 GCAATTCCCC |

Fig. 5a

| | | | | | | |
|---------|---------------------|---------------------|--------------------|--------------------|--------------------|--------------------|
| VR 2332 | 2530 GTCCCCCTCCC | 2540 GCACCGGTCC | 2550 GTGGGTTCGC | 2560 ATCCTAGCCG | 2570 GCGGTTGGTG | 2580 TCCTGGCAAG |
| VR 2332 | 2590 AATTCCTTCC | 2600 TAGATGAAGC | 2610 AGCGTATTGC | 2620 AATCACCTTG | 2630 ATGTTTTGAG | 2640 GCTTCTTAGT |
| VR 2332 | 2650 AAAACCTACCC | 2660 TCACCTGTCT | 2670 AGGAGACTTC | 2680 AAGCAACTCC | 2690 ACCCAGTGGG | 2700 TTTTGATTCT |
| VR 2332 | 2710 CATTGCTATG | 2720 TTTTTGACAT | 2730 CATGCCTCAA | 2740 ACTCAACTGA | 2750 AGACCATCTG | 2760 GAGGTTTGGA |
| VR 2332 | 2770 CAGAATATCT | 2780 GTGATGCCAT | 2790 TCAGCCAGAT | 2800 TACAGGGACA | 2810 AACTCATGTC | 2820 CATGGTCAAC |
| VR 2332 | 2830 ACAACCCGTG | 2840 TGACCTACGT | 2850 GGAAAAACCT | 2860 GTCAGGTATG | 2870 GGCAGGTCCT | 2880 CACCCCCTAC |
| VR 2332 | 2890 CACAGGGACC | 2900 GAGAGGACGA | 2910 CGCCATCACT | 2920 ATTGACTCCA | 2930 GTCAAGGCGC | 2940 CACATTCGAT |
| VR 2332 | 2950 GTGGTTACAT | 2960 TGCATTTGCC | 2970 CACTAAAGAT | 2980 TCACTCAACA | 2990 GGCAAAGAGC | 3000 CCTTGTTGCT |
| VR 2332 | 3010 ATCACCAGGG | 3020 CAAGACACGC | 3030 TATCTTTGTG | 3040 TATGACCCAC | 3050 ACAGGCAGCT | 3060 GCAGGGCTTG |
| VR 2332 | 3070 TTTGATCTTC | 3080 CTGCAAAAGG | 3090 CACGCCCGTC | 3100 AACCTCGCAG | 3110 TGCCTGCGA | 3120 CGGGCAGCTG |
| VR 2332 | 3130 ATCGTGCTGG | 3140 ATAGAAATAA | 3150 CAAAGAATGC | 3160 ACGTTTGCTC | 3170 AGGCTCTAGG | 3180 CAACGGGGAT |
| VR 2332 | 3190 AAATTTAGGG | 3200 CCACAGACAA | 3210 GCGTGTTGTA | 3220 GATTCTCTCC | 3230 GCGCCATTTG | 3240 TGCTGATCTA |
| VR 2332 | 3250 GAAGGGTCGA | 3260 GCTCTCCGCT | 3270 CCCCAAGGTC | 3280 GCACACAAC | 3290 TGGGATTTTA | 3300 TTTCTCACCT |
| VR 2332 | 3310 GATTTAACAC | 3320 AGTTTGCTAA | 3330 ACTCCCAGTA | 3340 GAACTTGCAC | 3350 CTCACTGGCC | 3360 CGTGGTGTCA |
| VR 2332 | 3370 ACCCAGAACA | 3380 ATGAAAAGTG | 3390 GCCGGATCGG | 3400 CTGGTTGCCA | 3410 GCCTTCGCCC | 3420 TATCCATAAA |
| VR 2332 | 3430 TACAGCCGCG | 3440 CGTGCAATCGG | 3450 TGCCGGCTAT | 3460 ATGGTGGGCC | 3470 CTTCGGTGTT | 3480 TCTAGGCACT |
| VR 2332 | 3490 CCTGGGGTCG | 3500 TGTCATACTA | 3510 TCTCACAAAA | 3520 TTTGTTAAGG | 3530 GCGGGGCTCA | 3540 AGTGCTTCCG |
| VR 2332 | 3550 GAGACGGTTT | 3560 TCAGCACCGG | 3570 CCGAATTGAG | 3580 GTAGACTGCC | 3590 GGGAATATCT | 3600 TGATGATCGG |
| VR 2332 | 3610 GAGCGAGAAG | 3620 TTGCTGCGTC | 3630 CCTCCCACAC | 3640 GGTTTCATTG | 3650 GCGACGTCAA | 3660 AGGCACTACC |
| VR 2332 | 3670 GTTGGAGGAT | 3680 GTCATCATGT | 3690 CACCTCCAGA | 3700 TACCTCCCGC | 3710 GCGTCCTTCC | 3720 CAAGGAATCA |
| VR 2332 | 3730 GTTGCGGTAG | 3740 TCGGGGTTTC | 3750 AAGCCCCGGA | 3760 AAAGCCGCGA | 3770 AAGCATTGTG | 3780 CACACTGACA |

Fig. 5b

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| | | | | | | |
|---------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|
| VR 2332 | 3790 GATGTGTACC | 3800 TCCCAGATCT | 3810 TGAAGCCTAT | 3820 CTCCACCCGG | 3830 AGACCCAGTC | 3840 CAAGTGCTGG |
| VR 2332 | 3850 AAAATGATGT | 3860 TGGACTTCAA | 3870 AGAAGTTCGA | 3880 CTAATGGTCT | 3890 GGAAAGACAA | 3900 AACAGCCTAT |
| VR 2332 | 3910 TTCCAACCTG | 3920 AAGGTCGCTA | 3930 TTTCACCTGG | 3940 TATCAGCTTG | 3950 CCAGCTATGC | 3960 CTCGTACATC |
| VR 2332 | 3970 CGTGTTCCCG | 3980 TCAACTCTAC | 3990 GGTGTAATTG | 4000 GACCCCTGCA | 4010 TGGGCCCCGC | 4020 CCTTTGCAAC |
| VR 2332 | 4030 AGGAGAGTCG | 4040 TCGGGTCCAC | 4050 CCACTGGGGG | 4060 GCTGACCTCG | 4070 CGGTCACCCC | 4080 TTATGATTAC |
| VR 2332 | 4090 GGCGCTAAAA | 4100 TTATCCTGTC | 4110 TAGCGCGTAC | 4120 CATGGTGAAA | 4130 TGCCCCCCGG | 4140 ATACAAAATT |
| VR 2332 | 4150 CTGGCGTGCG | 4160 CGGAGTTCTC | 4170 GTTGGATGAC | 4180 CCAGTTAAGT | 4190 ACAAACATAC | 4200 CTGGGGGTTT |
| VR 2332 | 4210 GAATCGGATA | 4220 CAGCGTATCT | 4230 GTATGAGTTC | 4240 ACCGGAAACG | 4250 GTGAGGACTG | 4260 GGAGGATTAC |
| VR 2332 | 4270 AATGATGCGT | 4280 TTCGTGCGCG | 4290 CCAGGAAGGG | 4300 AAAATTTATA | 4310 AGGCCACTGC | 4320 CACCAGCTTG |
| VR 2332 | 4330 AAGTTTTATT | 4340 TTCCCCCGGG | 4350 CCCTGTCATT | 4360 GAACCAACTT | 4374 TAGGCCTGAA | TTGA |

Fig. 5c

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| | | | | | | |
|---------|-------------------|--------------------|---------------------------|--------------------|--------------------|-------------------|
| VR 2332 | 10 ATGAAATGGG | 20 GTCCATGCAA | 30 AGCCTTTT <u>TTG</u> | 40 ACAAAATTGG | 50 CCAACTTTTT | 60 GTGGATGCTT |
| VR 2332 | 70 TCACGGAGTT | 80 CTTGGTGTCC | 90 ATTGTTGATA | 100 TCATTATATT | 110 TTTGGCCATT | 120 TTGTTTGGCT |
| VR 2332 | 130 TCACCATCGC | 140 CGGTTGGCTG | 150 GTGGTCTTTT | 160 GCATCAGATT | 170 GGTTTGCTCC | 180 GCGATACTCC |
| VR 2332 | 190 GTACGCGCCC | 200 TGCCATTAC | 210 TCTGAGCAAT | 220 TACAGAAGAT | 230 CTTATGAGGC | 240 CTTTCTTTCC |
| VR 2332 | 250 CAGTGCCAAG | 260 TGGACATTCC | 270 CACCTGGGGA | 280 ACTAAACATC | 290 CTTTGGGGAT | 300 GCTTTGGCAC |
| VR 2332 | 310 CATAAGGTGT | 320 CAACCCTGAT | 330 TGATGAAATG | 340 GTGTCGCGTC | 350 GAATGTACCG | 360 CATCATGGAA |
| VR 2332 | 370 AAAGCAGGGC | 380 AGGCTGCCTG | 390 GAAACAGGTG | 400 GTGAGCGAGG | 410 CTACGCTGTC | 420 TCGCATTAGT |
| VR 2332 | 430 AGTTTGGATG | 440 TGGTGGCTCA | 450 TTTTCAGCAT | 460 CTAGCCGCCA | 470 TTGAAGCCGA | 480 GACCTGTAAA |
| VR 2332 | 490 TATTTGGCCT | 500 CCCGGCTGCC | 510 CATGCTACAC | 520 AACCTGCGCA | 530 TGACAGGGTC | 540 AAATGTAACC |
| VR 2332 | 550 ATAGTGTATA | 560 ATAGCACTTT | 570 GAATCAGGTG | 580 TTTGCTATTT | 590 TTCCAACCCC | 600 TGGTTCCCGG |
| VR 2332 | 610 CCAAAGCTTC | 620 ATGATTTTCA | 630 GCAATGGTTA | 640 ATAGCTGTAC | 650 ATTCCCTCCAT | 660 ATTTTCCTCT |
| VR 2332 | 670 GTTGCAGCTT | 680 CTTGTA CTCT | 690 TTTGTGTGTG | 700 CTGTGGTTGC | 710 GGGTTC CAAT | 720 ACTACGTACT |
| VR 2332 | 730 GTTTTTGGTT | 740 TCCGCTGGTT | 750 AGGGGCAATT | 760 TTTCTTT CGA | 770 ACTCACAGTG | A |

Fig. 6